

No. 4. May, 1876.

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ILLUSTRATED CATALOGUE

OF

STEAM CRANES,

HAND CRANES,

HOISTING AND WINDING ENGINES,

OVERHEAD TRAVELLING CRANES,

AND OTHER MACHINERY,

Manufactured by

APPLEBY BROTHERS,

Engineers, Millwrights, etc.,

EMERSON STREET, SOUTHWARK,

LONDON, ENGLAND.

Registered Foreign Telegraphic Address—

“MILLWRIGHT, LONDON.”

 CENTENNIAL EXHIBITION.

Catalogue No. 804, Class 503.

CONDITIONS TO BE OBSERVED IN CORRESPONDENCE.

IN making inquiries, or in ordering Machinery from this Catalogue, it is desirable always to give the FULLEST DETAILS possible of the work to be done—stating especially the AVERAGE loads required to be lifted at a given radius, as well as the maximum loads at the shorter radius, and all such information as may lead the Authors to make their quotations for the MOST SUITABLE Machines, without the necessity of further correspondence, which of course would entail great loss of time.

The descriptions and price lists of the Steam Cranes and other Machinery herein have been made as clear and explicit as possible, giving the radius at which the *maximum* loads can be lifted, and it may be taken as approximately near, that *half* the maximum load may be lifted safely—by Cranes having variable jibs—at the *full* radius of the jib. It is necessary to state clearly the gauge of rails upon which Cranes have to travel, and it is most desirable to have the *widest possible* gauge, to give the greatest solidity or wheel base, and reduce the liability to overbalance when heavy loads are being lifted.

The cost of packing for shipment and delivery free on board export ship at Liverpool, may be calculated at six per cent. on the list prices.

The terms of payment are Cash, nett—against bills of lading and invoice,—payable by an English Banker, or approved English Mercantile Firm.

* * * This Catalogue is compiled expressly for the Centennial Exhibition, Philadelphia, 1876, but it is equally applicable for use elsewhere.

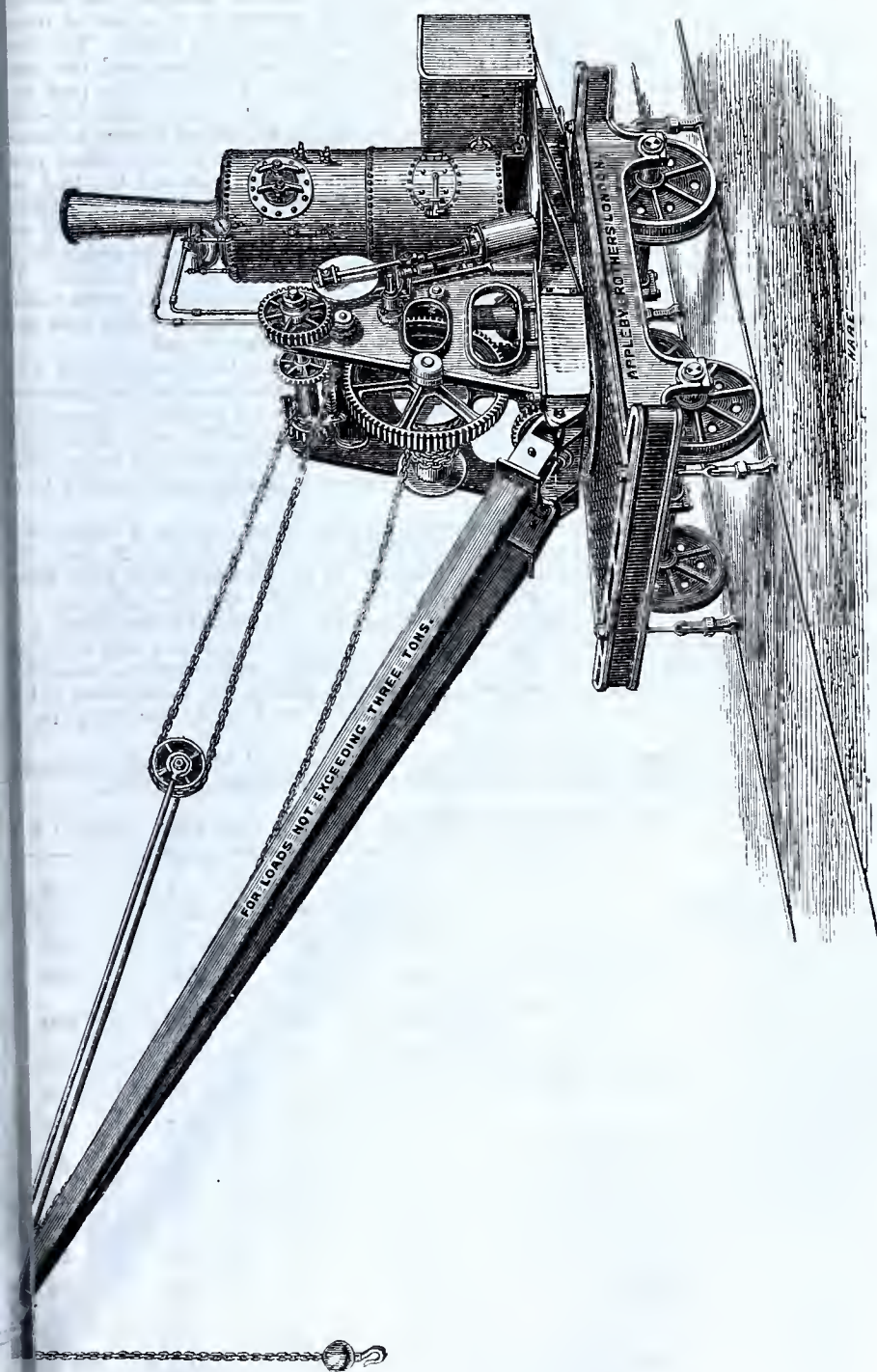


Fig. 1. LOCOMOTIVE STEAM CRANE (No. 43), TO LIFT THREE TONS.

THE Engraving, Fig. 1, No. 43, is from a Photograph of a Locomotive Steam Crane of the TYPE GENERALLY USED IN EUROPE when not required for travelling with ordinary railway rolling stock. The carriage is cast in one piece, the horns being provided with bearings for travelling wheels and bosses for rail clips, and there is a turned roller path in centre of carriage. All motion, namely, lifting, turning, altering radius, and travelling, are performed by a pair of direct acting steam cylinders placed slightly at an incline, one outside each side frame. The cranks are fitted into balanced disc plates; each cylinder has link reversing gear, and the pistons are guided by blocks working in bored guides cast to the cylinder covers. The post is wrought-iron turned to fit the revolving bed which carries the side frames. The feed-water tank and vertical boiler are carried from the revolving bed, and are placed at such a distance behind the post as to form some counterbalance to the load to be lifted. The lifting power is conveyed from the crank shaft to the chain barrel by means of spur gear, and the load may be lowered by reversing the engines, or by the brake. The turning motion is obtained through double friction clutches, and the Crane may be moved in either direction simultaneously with any other operation; this motion being performed by driving the friction roller under the jib instead of through toothed gear on the carriage, the risk of breakage is greatly reduced. The derrick motion is obtained by a worm and tangent-wheel on the chain-barrel, the worm locking the jib in any position. The travelling motion is conveyed from the crank shaft to both axles by a train of shafts and bevil wheels, one shaft passing down the centre of post.

The No. 41 Crane has only three of the four motions,—the steam travelling motion being omitted. Two of these Cranes have been selected by the Commissioners of the Centennial Exhibition at Philadelphia (1876), for unloading and placing the heavy portion of the exhibits. Both Cranes lift five-ton loads (one each No. 41 and 43), Catalogue No. 804. This type Crane was used for the same purpose by the Commissioners of the Exhibitions in Paris (1867, London (1871), Vienna (1873). Medals of the highest class were in each case awarded to the Exhibitors.

Fig. 2 is of the same type as Fig. 1, but of greater power, being capable of dealing with loads of 10 tons at 16 feet radius, or 5 tons at the exceptionally long radius of 25 feet. The photograph is taken from a Crane made by the Authors for the East and West India Dock, London, where it is in daily use. It is complete with all motions as described (No. 43). The larger-sized Cranes have double purchase lifting-gear, which with the return chain gives four speeds (instead of two in the smaller Cranes), and the Crane here shown has a jib and travelling carriage of wrought-iron, with sliding cross girders for increasing the wheel base when the Crane is required to work on a narrow gauge of rails, and a iron balance-box behind the boiler; in other respects it is similar in general details to Fig. 1, excepting in the proportions.

The average working expenses for these Cranes in London are about 12s. a day, the average work of a Three-ton Crane being 300 tons lifted 30 feet and deposited in trucks.

PRICE LIST OF PORTABLE AND LOCOMOTIVE STEAM CRANES. (Figs. 1 & 2)

Power of Crane in Tons	3	5	7	10
Maximum radius with full load	14' 0"	14' 0"	15' 0"	16' 0"
Price of Crane, to lift and turn, with fixed jib	£400	£500	£600	£800
Price of Crane to lift, turn, and alter radius of jib, all by Steam	425	530	635	850
Price of Crane to lift, turn, alter radius of jib, and travel all by Steam	450	560	680	900
Price extra for wrought-iron Jib	10	15	20	25
Price extra if fitted with handles for working by hand	5	5	10	10
Price extra for set of rail clips	5	6	7	10
Price extra for Felting, Lagging and Casing Boiler	15	18	20	20
Price extra for Galvanised Iron House	20	25	28	32
Price extra for Cross Girders to increase Base	10	15	20	25
Price extra for Steam Donkey Pump and Fittings	13	13	15	15
Price extra for Injector and Fittings	8	8	10	10
Price extra for Stoking Tools and Fitter's Tools	4	4	4	5
Approximate weight in Tons	10½	13½	16½	23
Approximate Measurement in cubic feet	500 e. ft.	580 e. ft.	700 e. ft.	900 e. ft.

Packing for Shipment and Delivery, F.O.B., Liverpool, Six per cent.

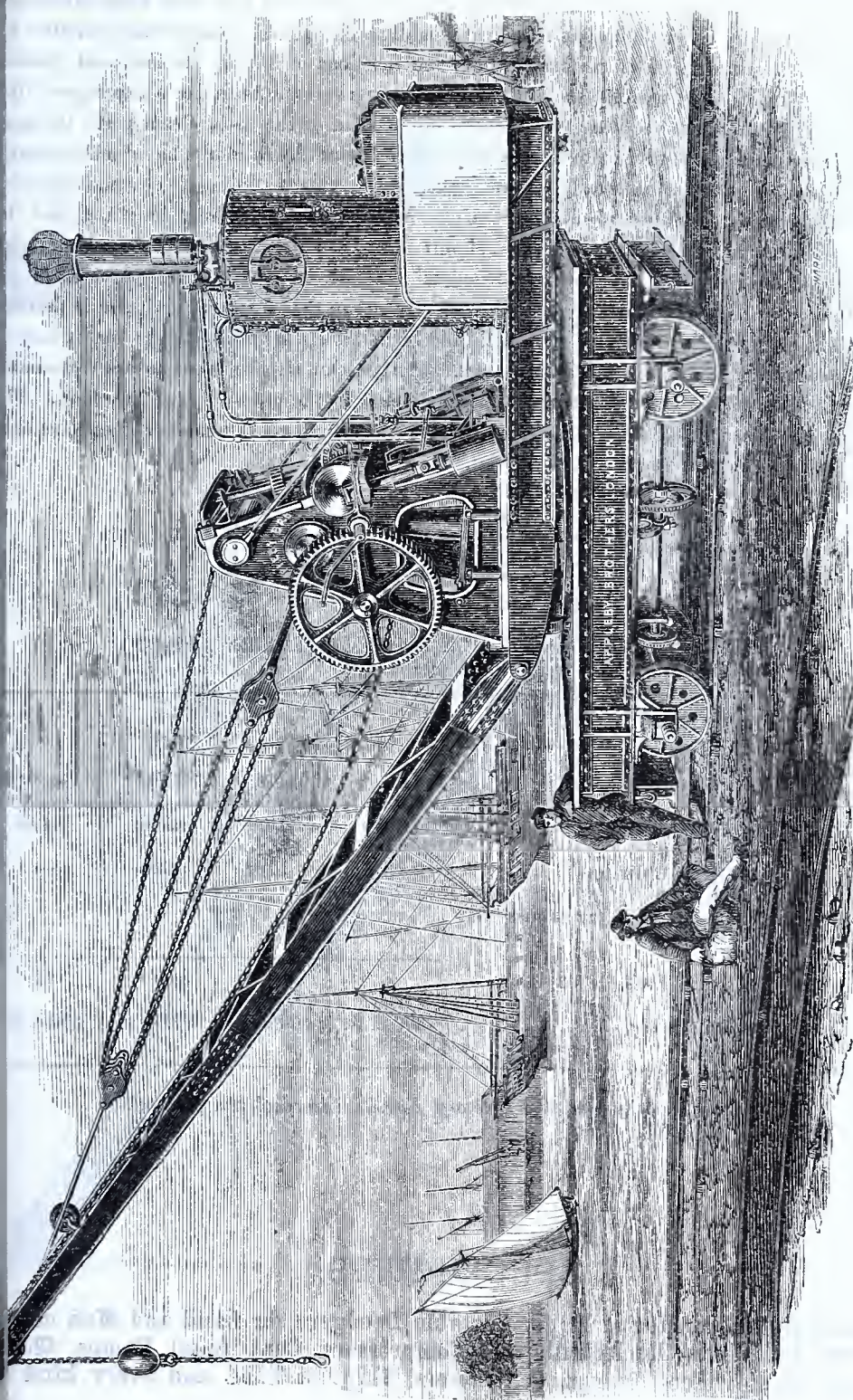


Fig 2 LOCOMOTIVE STEAM CRANE (No. 43), TO LIFT TEN TONS.

Fig. 3 (No. 60) illustrates a Portable Steam Crane of a different type from those previously referred to, the object in designing it being to make a cheap and simple Crane, suitable for Contractors' Work, capable of performing the two functions of lifting the load and turning entirely round with thorough efficiency, but not requiring a variable radius, or a steam-travelling motion. The Crane revolves on a strong central pin, instead of the usual Crane-post; the gear and working parts are kept close to the centre of gravity; and the cylinders have link-reversing motions, and are placed horizontally, so that the driver may have nothing to obstruct his view. The break and other levers and clutches are placed conveniently for ready handling, and the lifting and slewing motions may be worked simultaneously in either direction without stopping or reversing the Engine; the Boiler is complete with all necessary fittings, same as in the other Cranes. The general arrangement is so clearly shown that further description is perhaps unnecessary. The gauge of rails on which the Crane travels is usually $4\frac{1}{2}$; but it may be varied to meet the requirements of purchasers. The jib can also be made to any reasonable radius, but is usually about 14 feet from centre of Crane to the plumb line of the chain. The Engraving represents a Crane to lift 5 tons, and has two cylinders; the smaller sizes have only one cylinder, but are in other respects similar.

PRICE LIST OF PORTABLE STEAM CRANES. (Fig. 3.)

Power of Crane in Tons	1½	3	4	5
Maximum Radius with full Load	12'0"	14'0"	14'0"	14'0"
Price of Crane to Lift and Slew	£250	£300	£350	£430
Price extra, if with Two Cylinders	£15	£18	£20	—
<i>For Prices of Housings, &c., for Cranes see page 6.</i>				
Approximate Weight in Tons	6	7	9	11
„ Measurement	300 c. ft.	400 c. ft.	450 c. ft.	500 c. ft.

Packing for Shipment and Delivery, F.O.B., Liverpool, Six per cent.

SPECIALITIES.

Concrete Mixers, Mortar Mills, Portable Dredgers for Sand and Mud or for Sinking Cylinders, Rock-Drills and Compressors, Centrifugal Pumps, Chain Pumps, Donkey Feed Pumps, Contractors' Skips or Tubs, and every kind of Contractors' Machinery.

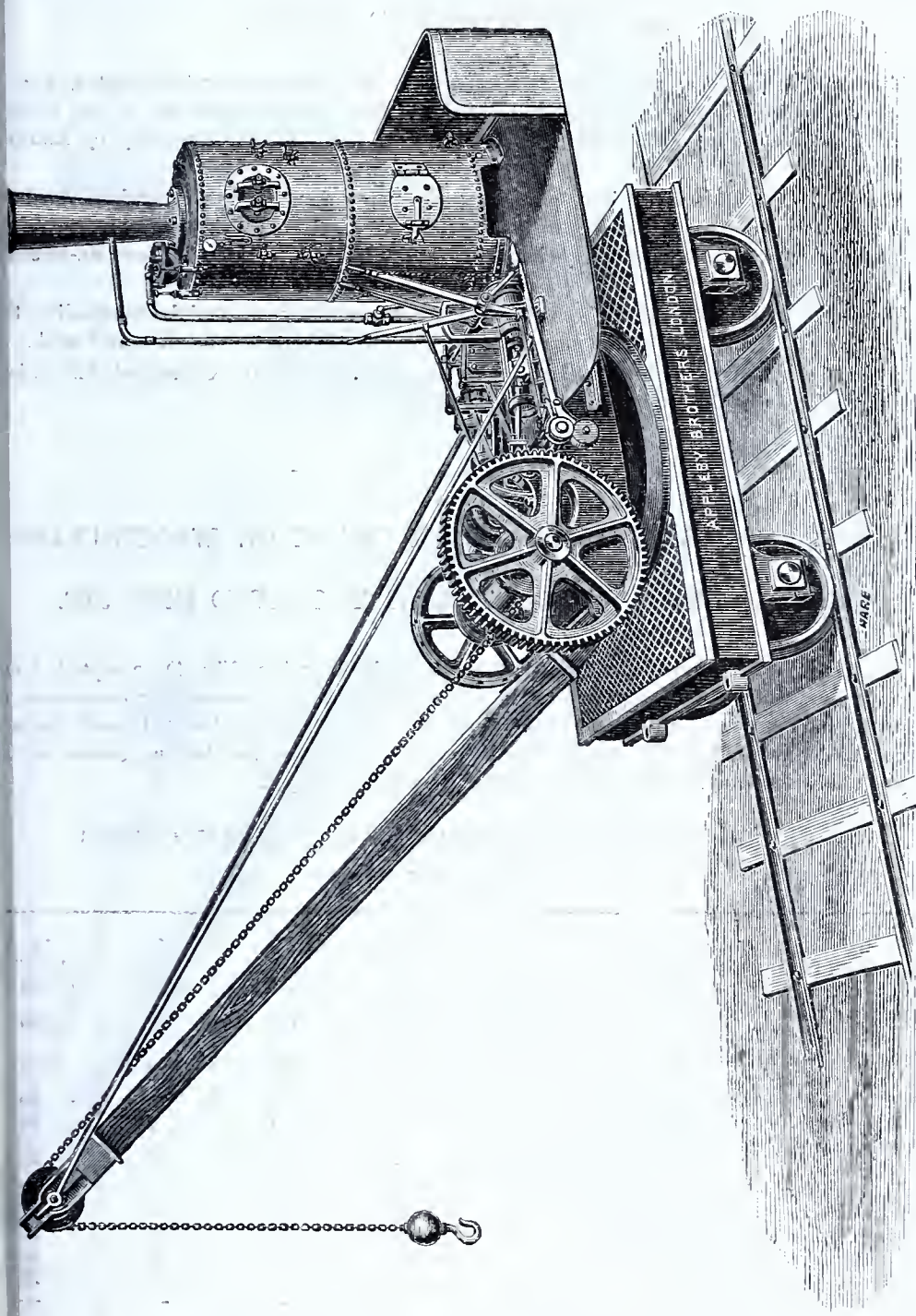


Fig. 3. PORTABLE STEAM CRANE WITH FIXED JIB (No. 60), SPECIALLY DESIGNED FOR CONTRACTORS' WORK.

Fig. 4. (No. 45) LOCOMOTIVE STEAM CRANE ON WROUGHT-IRON PERMANENT-WAY CARRIAGE.

THE superstructure of this Crane is the same as fully described and illustrated, Fig. 1. The carriage is, however, of different design and materials, and is constructed to run at high speeds with Locomotives and ordinary Rolling Stock as required more especially by Railway Companies.

The carriage is of wrought-iron, planked on the upper side with timber, and mounted on wrought-iron permanent-way wheels, with axles, axleboxes and guards, springs, buffers, draw bars and springs, coupling and safety-chains, break, &c. The Ten-ton Cranes have six-wheeled carriages.

The use of these Cranes is now becoming very general, and they are rapidly superseding the Hand Cranes, hitherto employed for special service, or for accidents or "break-down" work.

A Crane of this type has been selected by the Commissioners of the Centennial Exhibition Philadelphia (1876), for use in the American Section.

Fig. 5. (No. 44) LOCOMOTIVE STEAM CRANE ON WROUGHT-IRON PERMANENT-WAY CARRIAGE, WITH CURVED IRON JIB.

THE general description of this Crane is the same as the foregoing (Fig. 4), except that the jib is of wrought-iron and is of CURVED form, which in some cases is necessary or convenient, as in the Crane from which this photograph was taken. It was built for the "Midland Railway Company" (England), for lifting large logs of timber on to trucks, for stacking timber, or for lifting a disabled truck or carriage and placing it on a goods wagon.

PRICE OF LOCOMOTIVE PERMANENT-WAY STEAM CRANES.

(Figs. 4 & 5.)

Power of Crane in tons	3	5	7	10
Maximum Radius with full load	14'0"	14'0"	15'0"	16'0"
Price of Crane to lift and turn, with fixed Jib	£400	£610	£690	£1000
Price of Crane to lift, turn, and alter Radius of Jib by Steam	485	640	725	1050
Price of Crane to lift, turn, alter Radius of Jib, and travel all by Steam	510	670	770	1100
Price extra if fitted with handles for hand	5	5	10	10
Price extra for set of Rail Clips	5	6	7	10
Price extra for felting, lagging, and casing Boiler	15	18	20	20
Price extra for Galvanized Iron House	20	25	28	32
Price extra for Sliding Cross Girders	10	15	20	25
Price extra for Straight Iron Jib	10	15	20	25
Price extra for Curved Iron Jib	15	20	30	40
Approximate weight in tons	12	15	18	23
Approximate measurement in cubic feet	—	—	—	—

Packing for Shipment and Delivery, F.O.B., Liverpool, Six per cent.

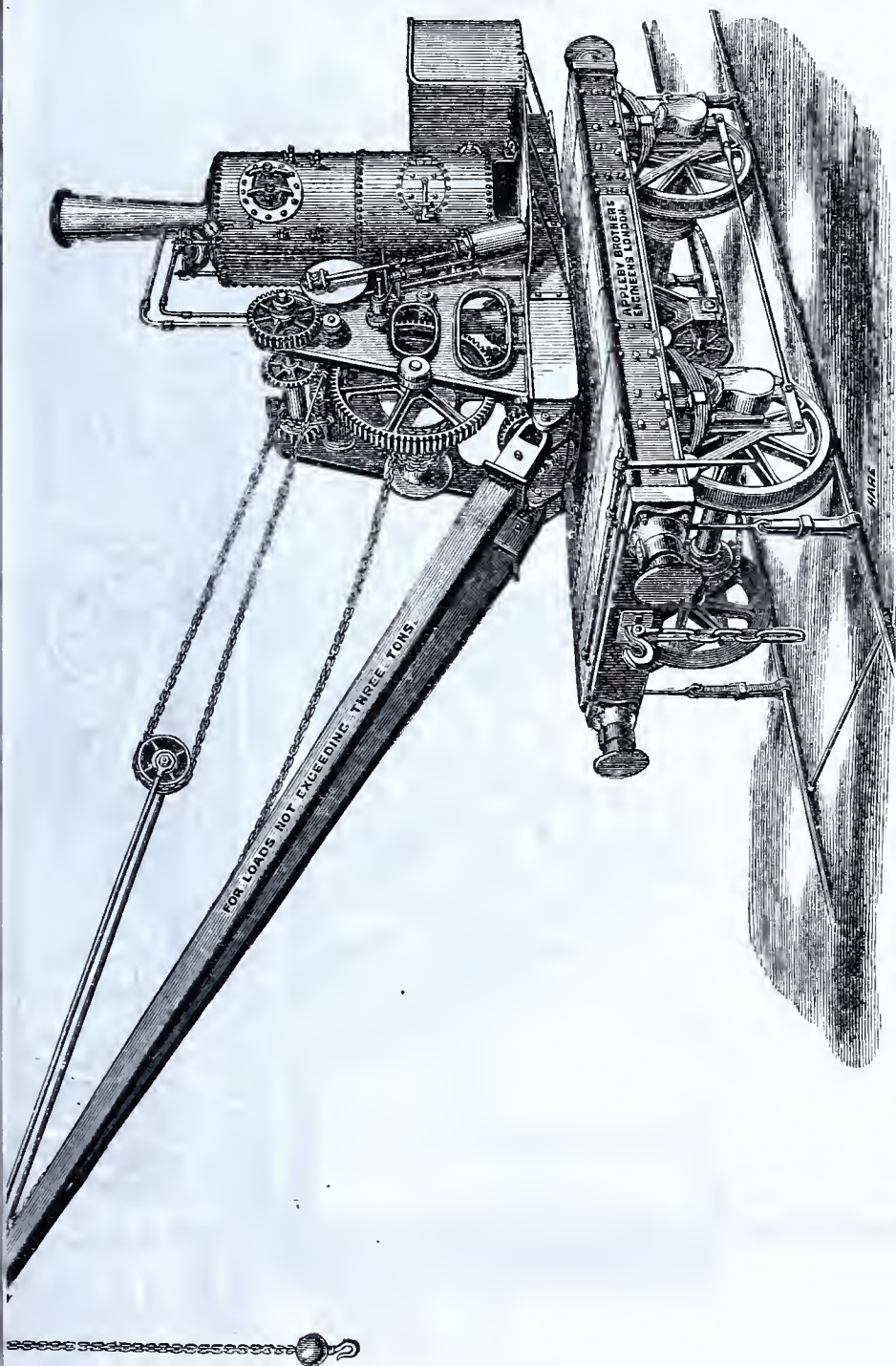
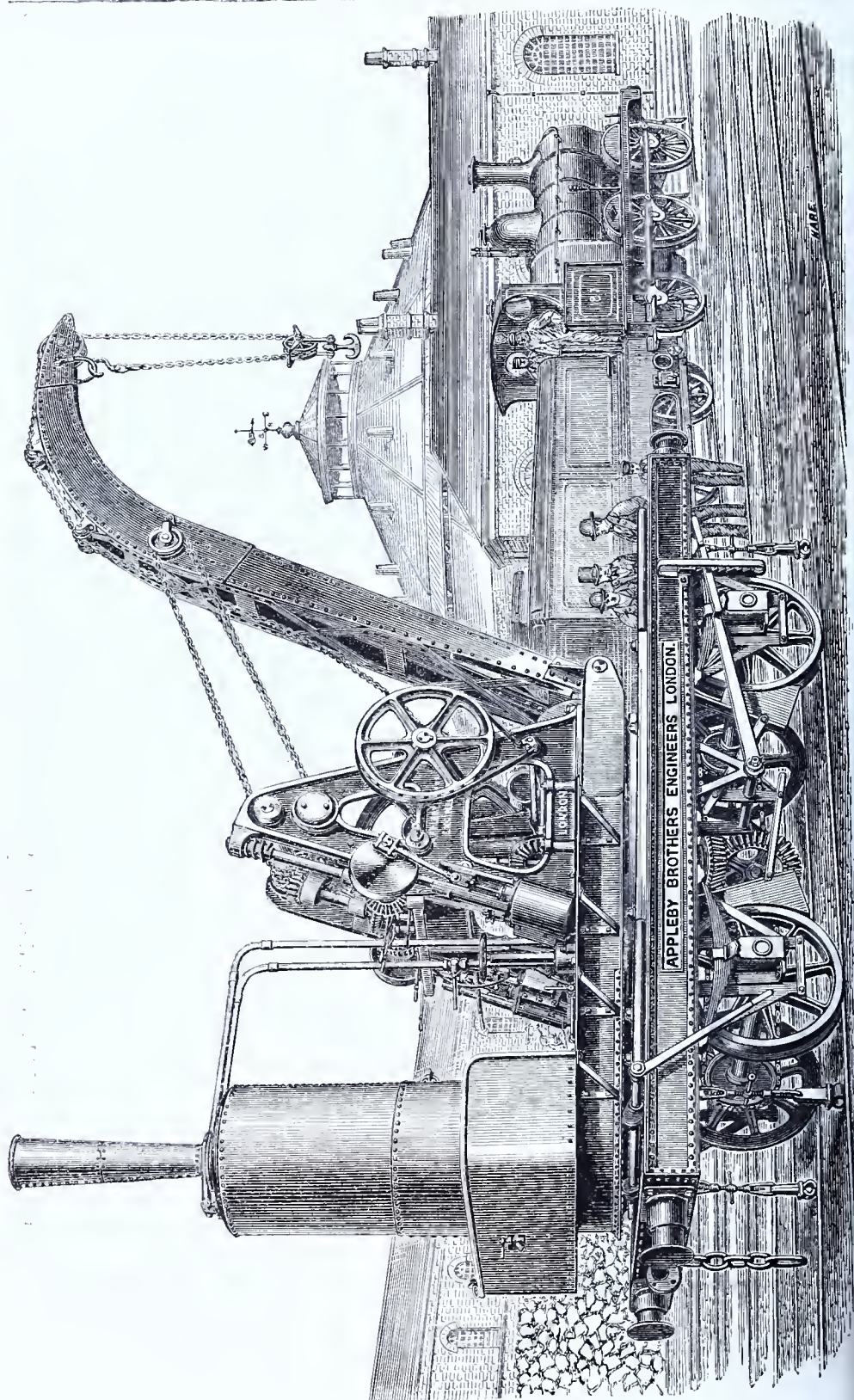


Fig. 4. LOCOMOTIVE STEAM CRANE (No. 45), ON WROUGHT-IRON PERMANENT-WAY TRUCK, WITH BUFFERS, SPRINGS, &c.



Reprint from "THE JOURNAL OF INDUSTRY," August 2nd, 1875.

ON STEAM CRANES AS APPLIED TO DOCKS, WHARVES, RAILWAYS, &c.

STEAM CRANES.

THE introduction of Steam Cranes adapted and applied to loading and discharging ships' cargoes, has probably effected a more substantial saving of time, labour and money than any other class of machinery. So many interests are served by the rapidity with which ponderous goods can be lifted from the ship's hold to the railway waggon or *vice versa*, that we may regard every improvement in this direction as a matter of vital importance to the mercantile world. The Crane plays a conspicuous part in the facilities and cost of conveyance, because it grapples, more or less successfully, with the most difficult operations of transit. We do not propose to enter minutely into the general application of improved lifting power, but we desire to point out the importance of an efficient system of Steam cranes for loading and discharging cargoes.

Messrs. APPLEBY BROTHERS, of Emerson Street, Southwark, London, have devoted a large share of attention to this subject, and we are indebted to improvements introduced by them for systems of Steam Cranes, which, when generally introduced at our large ports, cannot fail to effect an immense saving of time and money.

In a "Report to the Communal Administration of the City of Antwerp on a system of Cranes to be employed for loading and discharging cargo at the port of Antwerp," Mr. C. J. APPLEBY exhibits thorough knowledge of the requirements of a great commercial port, and an accurate appreciation of the conditions to be fulfilled by a system of Portable Cranes capable of dealing with all varieties of merchandise and different dimensions of vessels. "Vessels frequenting the port of Antwerp," writes Mr. APPLEBY, "vary so much in length and beam that it would be impossible to regulate the distance between Fixed Cranes in such a manner that there could be any probability of the total Crane-power being at all fully employed, and if it were not, the amount of capital sunk in the unemployed cranes, with their foundations and accessories, would be unproductive. There is, however, the more important consideration that, whilst endeavouring to berth ships under the Cranes, a certain length of highly valuable quay-room inevitably remains unoccupied, involving a further amount of capital."

These remarks are really applicable to all ports where a considerable extent of dock or quay offers facilities for vessels of all dimensions to lie alongside. Accepting, therefore, Portable Cranes as the most convenient and economical for this class of work, it remains for us to decide on the form of Portable Crane best adapted to meet the requirements of constant work under all conditions of temperature, and at a satisfactory speed on occasions of great pressure. After a careful consideration of the merits of the hydraulic and compressed-air system, Mr. APPLEBY rejects them in favour of the type of Crane carrying its own steam power. Of Portable Hydraulic Cranes he speaks with the most fairness, and we believe that he is fully justified in confessing that their failure hitherto has been "due more to defective design or construction than to any difficulty really inherent in the system." But low temperatures interfere with the working of hydraulic power; and for this reason alone they cannot be recommended in northern latitudes. Atmospheric Cranes are justly dismissed from consideration as too complicated and costly. It is possible that such improvements may be effected in both Hydraulic and Atmospheric Cranes that these objections may be removed; but we have to deal with actual facts and results, rather than vague theories and conjectures. The question of supplying quays and docks with mechanical appliances for the prompt loading and discharge of cargoes, is really a matter of national importance. The loss incurred by every day's delay in the performance of this work is distributed over a large number of people; but if accurately estimated, the total would be surprisingly large.

Manufacturers, shipowners, merchants, dock and railway companies, dealers and customers, all suffer more or less by the delays consequent on an ineffective system of loading and discharging cargoes. Mr. APPLEBY believes—and experience certainly justifies the belief—that Portable Cranes which steam power is employed directly, are preferable to those in which it is converted into hydraulic force.

"The construction," he says, "first mentioned has been employed to a limited extent, and has given more or less satisfactory results; but I avoid that construction, because, in addition to the inconvenience already referred to when working in cold weather, the conversion of steam power to hydraulic force involves a certain loss of power, which, together with that incidental to a column of water passing at a very high pressure through the small area of the inlet valve, is greater than is incurred in working spur-gear of good design and proportions; and there is the further, and in my mind very important, disadvantage that the engine-power is not available for some of the operations performed by Cranes which

1. Lift and lower.

2. Turn completely round in either direction simultaneously with the lifting or lowering.

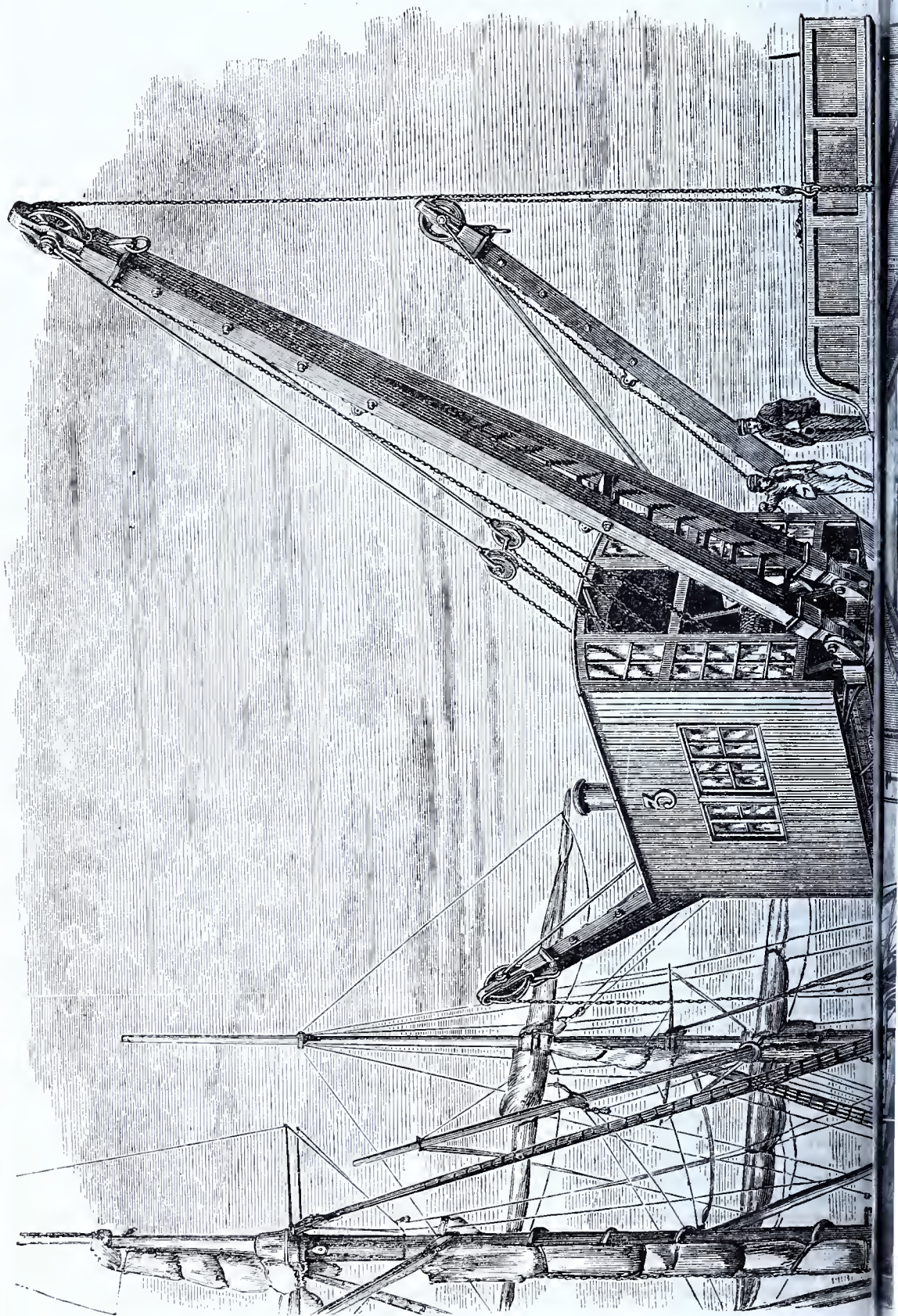




FIG. 6. OVERHEAD STEAM CRANES AT MIDDLESBROUGH DOCKS. (No. 50).

3. Alter the radius by raising or lowering the jib head; and

4. Travel along rails by steam: All these motions being easily worked by one man, who attends to the boiler.

This type of Crane will perform probably about 80 per cent. of the work of the docks; but for dealing with the cargo of the largest class of seagoing vessels, which, when empty, will rise to a considerable height above the level of the quay, a different construction is necessary. "The Overhead Steam Crane, similar to that designed by Messrs. APPLEYBROTHERS, and erected by them at Middlesbrough Docks, meets the requirements of the largest vessels, and enables the smaller Cranes to pass to and fro beneath. The success which attended the operations of this system has led to its adoption elsewhere. In South America, as well as on the continent of Europe, modifications suitable to the class of work to be performed have been introduced.

"At Callao, gantries are fixed at intervals, so as to work at least two hatchways of the vessels frequenting each berth; the jetties are about 80 feet wide, and there is a range of warehouses below each gantry parallel with the lines of railway on each side. The Cranes travel by steam ACROSS THE GANTRIES, and will load or discharge from the warehouses, trucks, or vessels, on either side of the jetty, as may be required.

"On the continent of Europe, Cranes of a lighter type, mounted on a timber gantry, are found ample for the work to be performed. The machinery and ironwork are usually prepared in England, and are fixed to the timber framing, which is made on the spot; assuming the cost of timber work to be the same as in England, there is at least the saving in freight and duty."

As to speed of working the Overhead Steam Cranes at Middlesbrough, we are informed that as much as 50 tons of pig-iron have been shipped per hour by each Crane; but of course much must depend on the facilities for bringing goods to the Crane, and on the character of the goods themselves.

The Docks at Middlesbrough were constructed by the North Eastern Railway Company to meet the pressure of an increasing shipping traffic. The usual types of Steam and Hydraulic Cranes then in general use failed to afford entire satisfaction to the Dock authorities. They did not fulfil all the conditions demanded by a large traffic with vessels of all dimensions, the sides of which were

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(Continued.)

sometimes 15 or even 20 feet above the level of the quay. It was accordingly determined to submit the conditions to the engineering world, and to see what plan could be devised to secure an economical and effective system of Cranes capable of grappling successfully with the heavy work of these busy Docks. The design submitted by Messrs. APPLEBY BROTHERS promised to overcome every difficulty, and to satisfy every requirement. It was accepted. The splendid system of Cranes, which we illustrate, was completed, and their performances have surpassed the most sanguine anticipations of the Dock authorities. They have really afforded a valuable lesson for dock authorities in all parts of the world, and, with modifications, they are applicable to the wants of all large ports.

Our valuable contemporary, "*Engineering*," has thus described these grand mechanical appliances:—

"The travelling staging or gantry of each Crane has a span of 23 feet centre to centre of rails, one of the latter being laid close to the edge of the quay, and the other in the 6 feet between rails. The clear height is 17 feet 6 inches, which allows the uninterrupted circulation of locomotives and all kinds of rolling-stock on each of the two lines of rails which are spanned by the gantry. The travelling wheels are 12 feet centre to centre. The framing is composed of a pair of timber uprights, braced and strengthened by cast-iron brackets and two wrought-iron plate girders, which are connected to the timber uprights by four wrought-iron plate brackets, strengthened with angle-irons. A strong carriage, with the necessary roller path and brackets for the gear required to transmit the travelling motion, which will shortly be referred to, is firmly bolted at the extreme end of the girders nearest to the Dock, while the girders are planked over so as to form a store for coal and water. The Crane and the whole of the substructure is designed for a working load of 5 tons at the maximum radius of 21 feet from centre of Crane-post to the plumb-line of the lifting chain; while the Crane itself is of precisely the same construction as those which have given satisfactory working results elsewhere, with apparatus for altering the radius by steam from a maximum of 24 feet to a minimum of 14 feet.

"The travelling motion is transmitted from the Crane-engines by suitable gear and shaft to the travelling wheels, and warping drums or capstans are fitted on a countershaft on the inner side of each frame, so that these warping drums can be driven independently of the travelling wheels, and they are used for moving the trucks into position below the Crane, as they are required for loading and unloading. This simple addition is found to effect a very large saving in manual labour and time, which, it is estimated, amounts to at least £300 per year, because without this appliance, horses and locomotives must be kept constantly employed, involving working expenses and wear and tear, in addition to the maintenance of the road, whilst with the capstans the trucks are brought into position by the men in stowing and slinging, with no further wear and tear of road than that due to the paying load. As it was decided to adopt this system of Crane throughout the Dock, the two lines of rails spanned by the gantry are laid with crossings at such intervals as will admit of either line being used for full or empty trucks, or in fact partially for both purposes if desired.

"Another great advantage which has been demonstrated by practice is, that the Crane can be so readily concentrated at any point where they may be required; and, indeed, as shown in the Engraving, three of these Cranes are brought to load a long screw steamer having three hatchways. This is evidently a most important consideration with owners and shippers, especially under circumstances which so frequently arise where great despatch is essential. Or two Cranes can be brought together for any exceptionally heavy lift. The Cranes were tested with the maximum working load of 5 tons, and subsequently for speed when each Crane delivered 50 tons per hour from the trucks into the steamer's hatchways."

It will be manifest to our readers that such a system of Steam Cranes must be applicable with great advantage to many other purposes beside those of dock-work. Stone quarries, railway stations, and large factories and depôts having railway communication, would find the system a valuable means of economising labour, and ensuring greater despatch in the delivery of heavy goods.

STEAM CRANES AND HOISTS
FOR
CONTRACTORS, BUILDERS, &c.

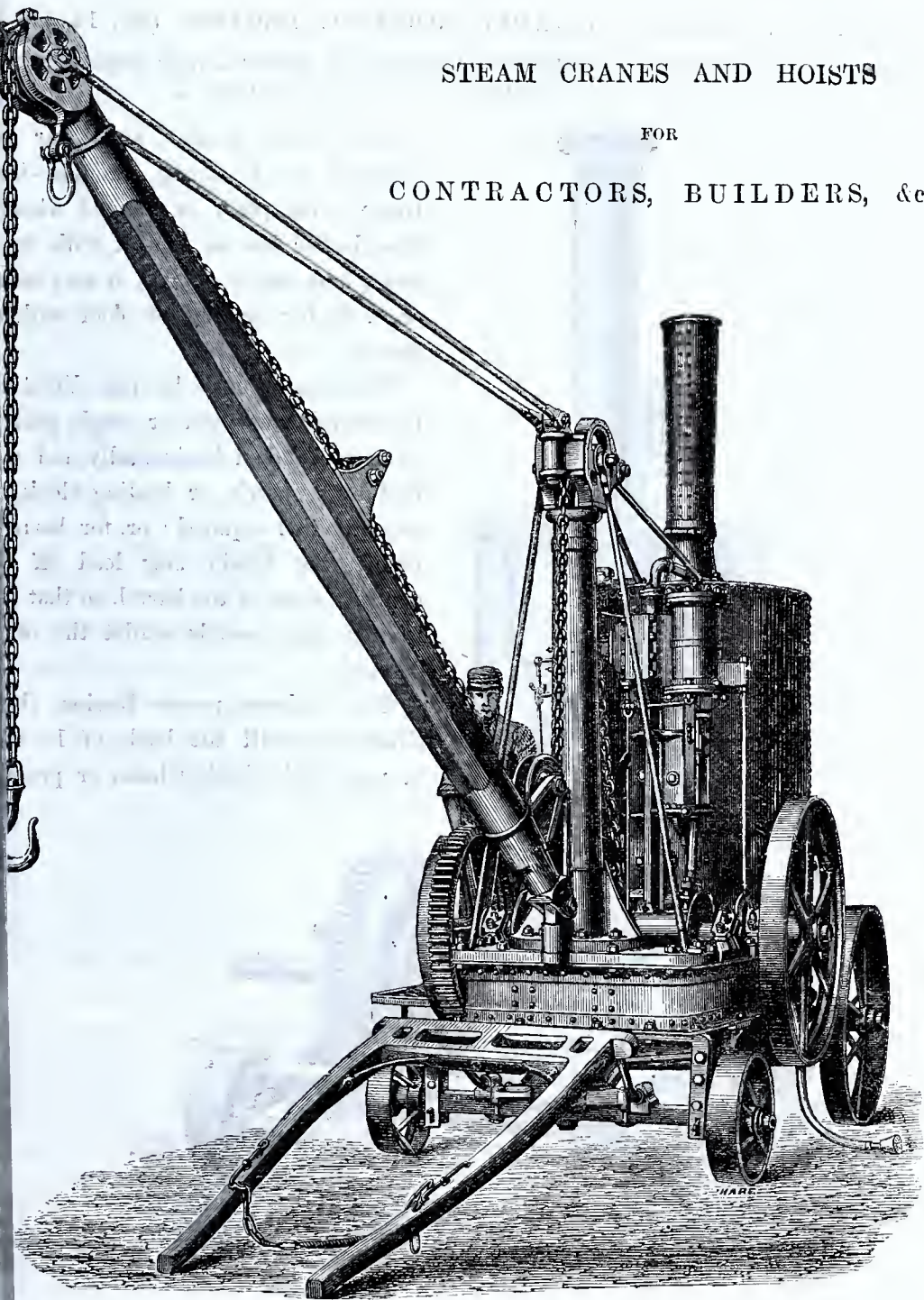


Fig. 7. IMPROVED SINGLE CYLINDER CONTRACTOR'S PORTABLE
STEAM CRANE, OR HOISTING ENGINE. (No. 13.)

WITH Pillar, and Jib to swing fully half round, and Chain to reach 15 feet below
ground line. The Engraving is taken from a Photograph of a Crane of 8-Horse
Power—which is the size generally used, and will lift and deal with average loads
of 10 Cwt. at quick speed and with Single Chain as shown. Price £295.

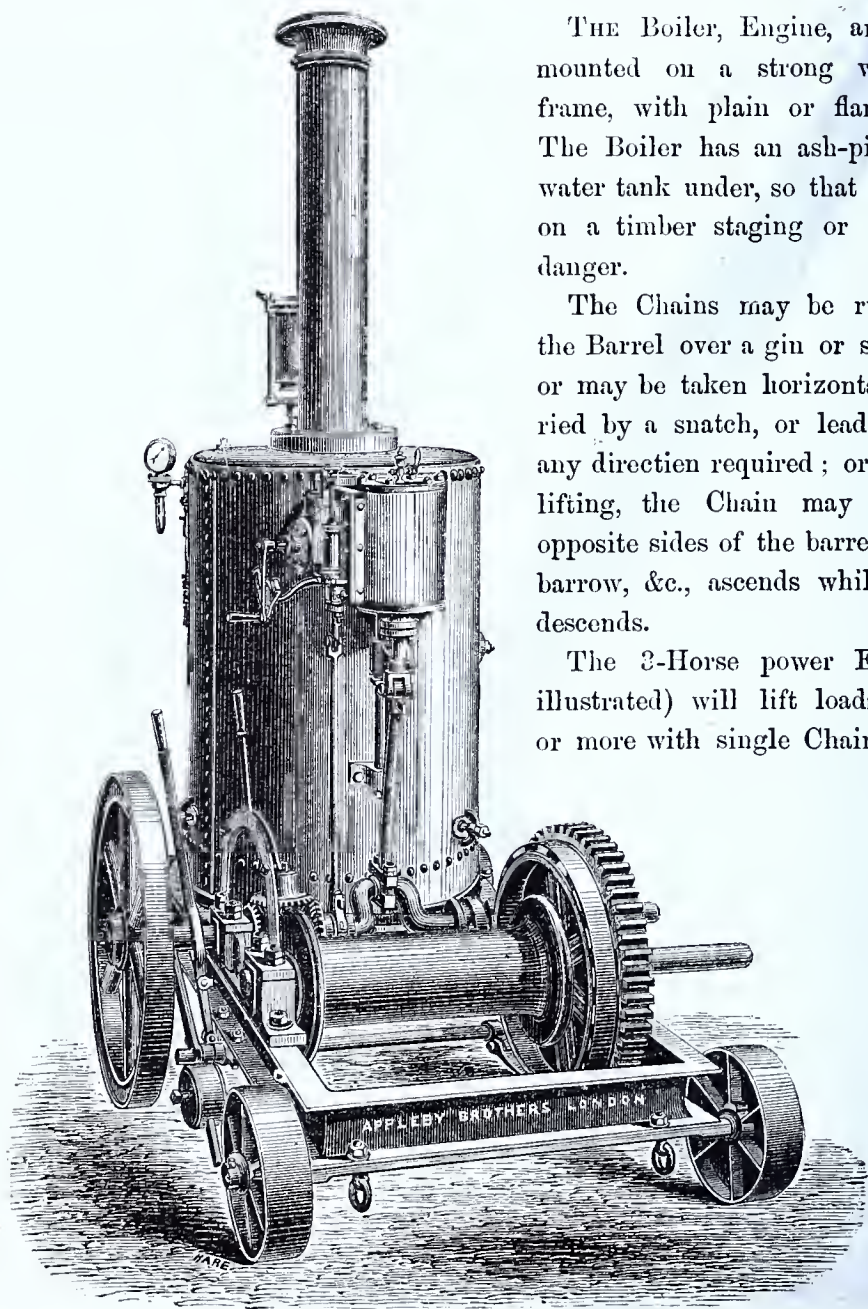
Fig. 8. SINGLE CYLINDER HOISTING ENGINE. (No. 13A.).

FOR LIFTING BARROWS OR BUILDING MATERIALS, IN WORKS UNDER CONSTRUCTION
OR FOR USE ON SHIP'S DECK, QUAYS, WHARFS, &c.

THE Boiler, Engine, and Gear are mounted on a strong wrought-iron frame, with plain or flanged wheels. The Boiler has an ash-pit, with feed water tank under, so that it may stand on a timber staging or floor without danger.

The Chains may be run direct over the Barrel over a gin or single pulley; or may be taken horizontally and carried by a snatch, or leading-block, in any direction required; or, for barrow lifting, the Chain may lead off the opposite sides of the barrel, so that one barrow, &c., ascends whilst the other descends.

The 3-Horse power Engine (here illustrated) will lift loads of 15 cwt or more with single Chain, or propo



tionately heavier loads if a single sheave-block and return chain is used. The engine has a reversing motion and strap break with foot lever, and a clutch to throw the barrel out of gear when lowering by the break. A capstan end may be fitted to the long end of the barrel shaft, which is often found useful; the capstan is included in the list of prices.

Price of Engine as shown and described . . £155.

Fig. 7. CONTRACTOR'S STEAM CRANES. (No. 13.)

Nominal Horse-Power . .	SINGLE CYLINDER.					DOUBLE CYLINDER.		
	3	4	6	8	12	6	8	12
Diameter of Cylinder . .	5½"	6½"	7¼"	9"	11"	5½"	6½"	7¼"
Price, with road-wheels, shafts, and locking-plate	£ 190	£ 228	£ 260	£ 295	£ 370	£ 286	£ 355	£ 415
Price, with plain or flanged wheels for trams or railway (without shafts and locking-plate)	185	223	255	289	360	281	350	405
Price, without wheels and axles for fixing on timber, brick, or other foundations	180	218	249	282	352	275	343	397
Extra for governors and expansion-valve	10	12	13	20	25	15	20	25
Extra for link-motion reversing gear	7	8	10	11	12	15	18	20
Extra for felting, lagging, and covering boiler with sheet-iron.	10	12	13	15	16	13	15	17
Extra for skeleton roof	8	9	10	10	10	10	10	10
Extra for packing for shipment	7	8	9	10	12	9	10	12
Approximate weight (tons) . .	3½	4½	5	7¼	8¼	4	7½	8½

Fig. 8. HOISTING-ENGINES. (No. 13 A.)

Nominal Horse-Power . .	SINGLE CYLINDER.					DOUBLE CYLINDER.		
	3	4	6	8	12	6	8	12
Diameter of Cylinder . .	5½"	6½"	7¼"	9"	11"	5½"	6½"	7¼"
Price, with plain or flanged wheels for tram or rails (without shafts and locking-plate)	£ 155	£ 195	£ 220	£ 245	£ 315	£ 250	£ 288	£ 360
Price, without wheels and axles (for fixing on brick or timber)	150	190	214	238	307	244	281	352
Price, with road-wheels, shafts, and locking-plate	160	202	228	255	325	255	295	370
Extra for governors and expansion-valve	10	12	13	20	25	15	20	25
Extra for link-motion reversing gear	7	8	10	11	12	15	18	20
Extra for felting, lagging, and covering boiler with sheet-iron.	10	12	13	15	16	13	15	17
Extra for skeleton roof	8	9	10	10	10	10	10	10
Extra for packing for shipment	6	7	8	9	10	8	9	10
Approximate weight (tons) . .	2¾	3¼	3¾	5¾	7½	3¾	6	7¾

Packing for Shipment and Delivery, F.O.B., Liverpool, Six per cent.

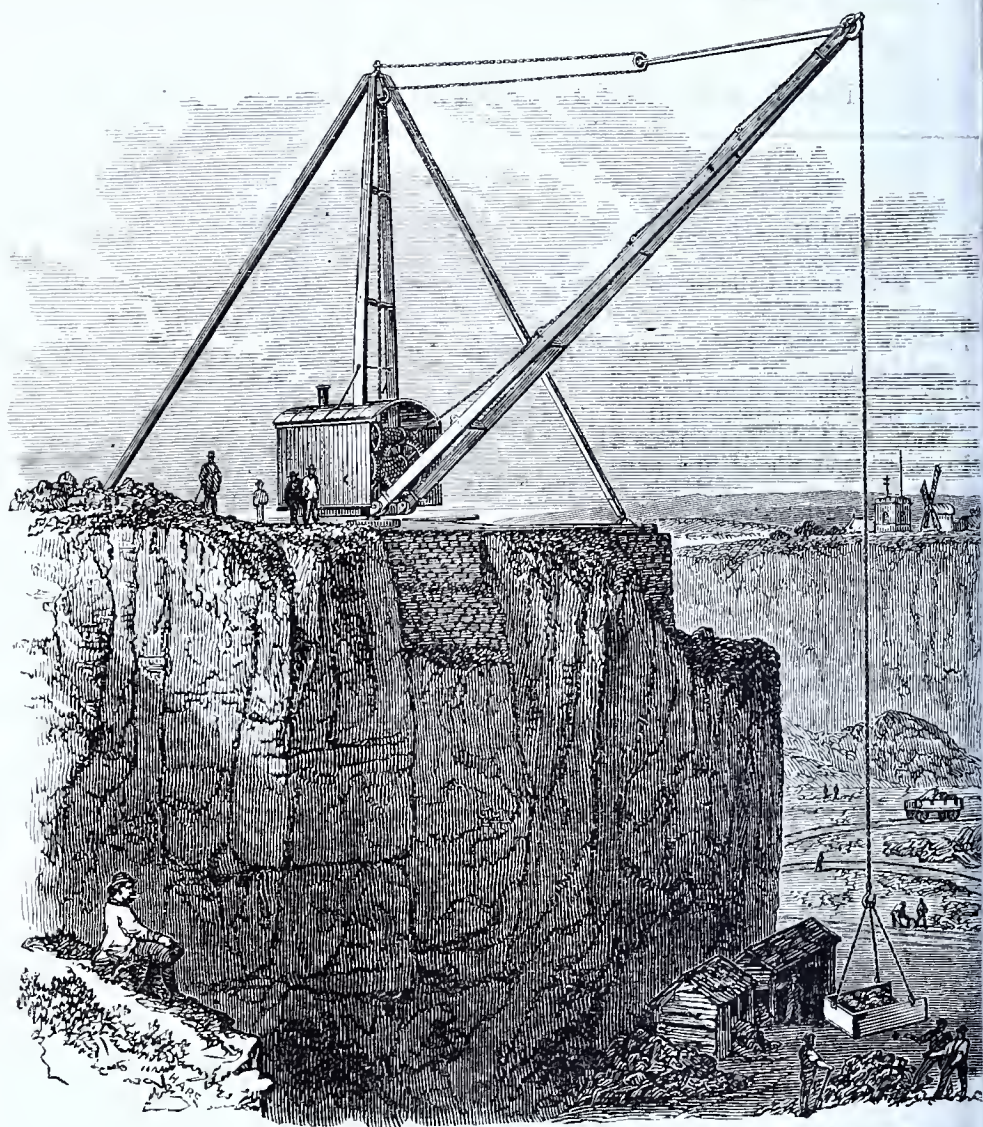


Fig. 9. STEAM DERRICK, QUARRY, OR GUY CRANE.

THESE Cranes swing round about three-fourths of a circle, and are moderate in first cost, easily fixed and moved, and require no support from buildings. They are extensively used in Quarries, Stone-yards, and in Constructive Operations generally, where the great height of reach-out, as well as the variable radius, render them especially valuable.

The small sizes of Cranes have one cylinder (oscillating); the larger sizes have two cylinders fixed to the side frames, similar to the Steam Cranes (Fig. 1, &c.). The Boiler is placed behind and made to swing with the mast; the Engines have reversing motions, strap-break, and necessary fittings; both the derrick and the lifting gear is fitted to work by hand or steam power, the latter in single or double purchase. The prices include the timbers, all the iron work and chains to reach to ground line. Cranes placed near to each other are sometimes worked from one stationary Boiler. The Engraving shows one of a series of Ten-ton Cranes at work at a large granite Quarry in Leicestershire (England).

PRICE LIST OF STEAM DERRICK OR GUY CRANES. Fig. 9.

Power of Crane in Tons	3	4	5	6	8	10
Maximum Radius in Feet	35'.0"	30'.0"	25'.0"	35'.0"	30'.0"	25'.0"
Price of Crane with fixed Jib, with- out Boiler	£300	£300	£300	£450	£450	£500
Price of Crano with Derrick Jib, without Boiler	£330	£330	£360	£490	£490	£590
Price extra with Slewing Gear . . .	£20	£20	£20	£25	£25	£25
" Boiler & Water Tank	£75	£75	£80	£80	£80	£80
" Iron Housing	£18	£18	£20	£20	£25	£25
approx. Weight in Tons	6	6	7	8	9	12
" Measurement in cubic feet . . .	500 c. ft.	500 c. ft.	500 c. ft.	600 c. ft.	700 c. ft.	800 c. ft.

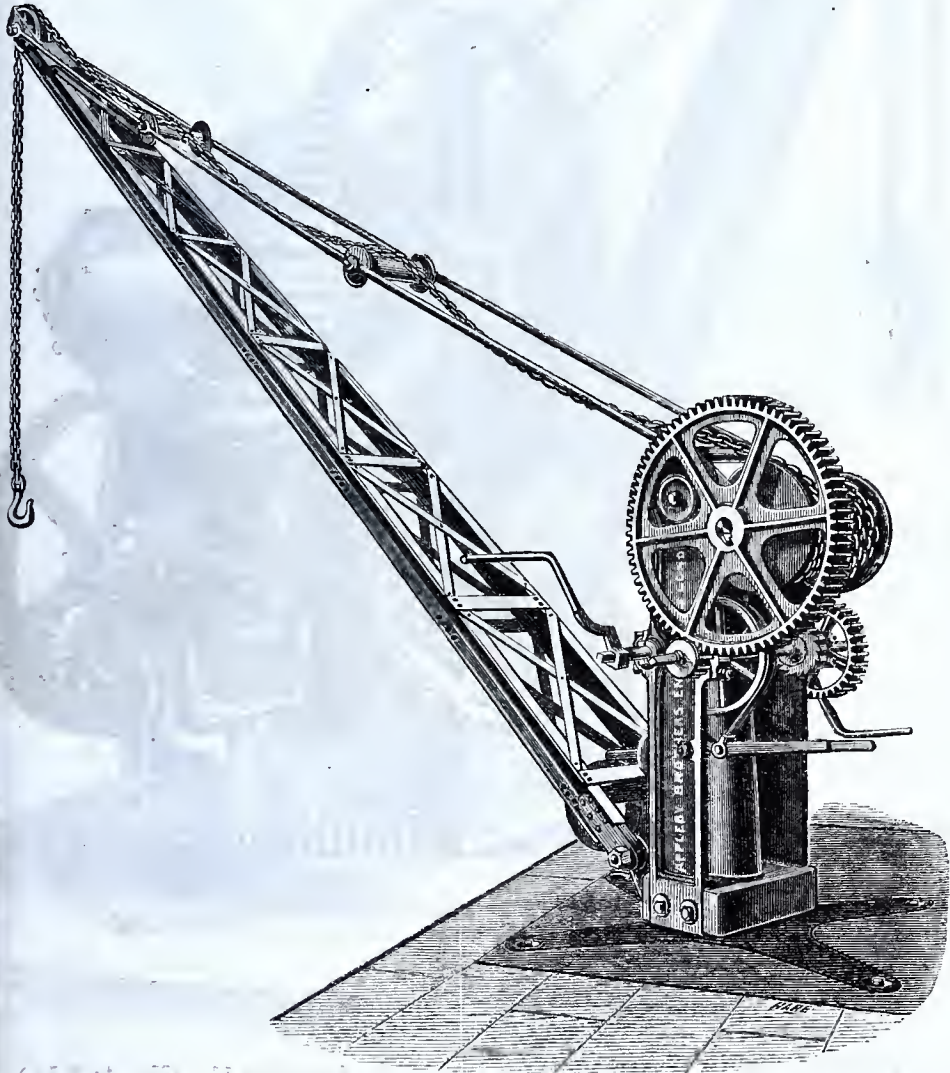


Fig. 10. HAND WHARF CRANE. (No. 4A.)

THE Engraving represents a Two-ton Crane. In large sizes they are usually made with slewing or slewing motion. Each Crane has single and double-purchase lifting gear, strap, hook, wrought-iron crane-post, top and bottom foundation plates and bolts to pass through the foundations, handles to work all the motions, and chains to reach the ground line. The general arrangement and design of the Cranes is similar for all powers, from two to thirty tons, the difference being in the proportions.

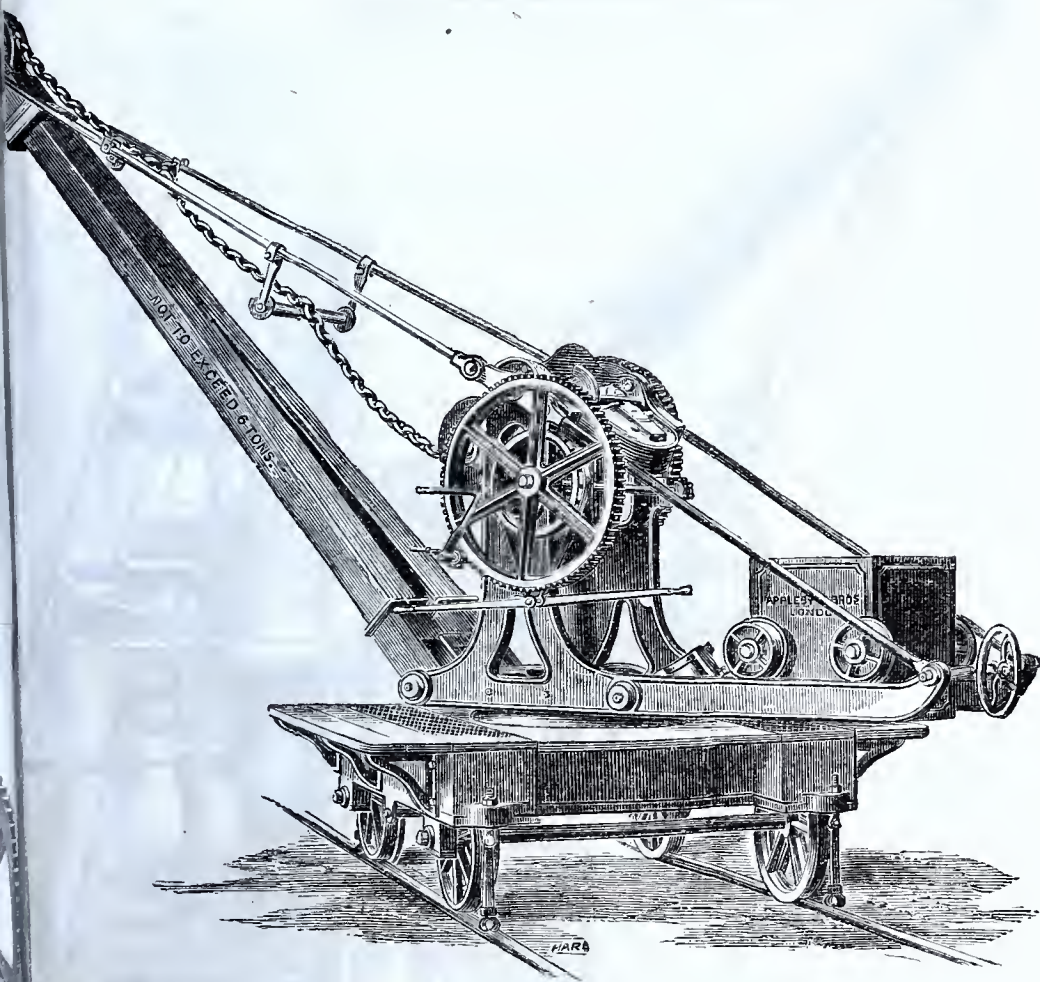


Fig. 12. PORTABLE HAND CRANE, GOVERNMENT PATTERN. (No. 1.)

These Cranes are constructed to work loads varying from 1 to 10 tons (see also Nos. 1A and 1B) and can be adapted to work on any gauge of Railway. They are used by Her Majesty's Government as well as by some of the leading Railway and Dock Companies.

The Base Plate is in one massive casting, chequered on the top, and of sufficient size to allow men to work at whatever angle the Crane may be. The Crane-post is of hammered iron; the wheels and pinions are lined up to their pitch lines, the pinions being thrown in and out of gear by clutches; the journals are of great length, the shafts run in gun-metal bearings, and the working parts throughout are accurately fitted and carefully finished.

The Balance Weight Box is of ample size, and is moved along the tail-pieces by a traversing screw worked by a hand-wheel. There is a friction roller to take the weight off the back balance to reduce friction when turning. The Engraving shows a Crane of the 6-Ton size.

Special designs and estimates will be given for "Permanent-way" and "Accident" Cranes for use on Hand-power, to run with ordinary stock, with or without Tenders, complete with Chains, Packings, and Tool Chests, &c.

To lift 3 Tons	Price £165.	Approx. Weight, $4\frac{1}{2}$ Tons.
" 5 "	" £290.	ditto 9 "
" 7 "	" £350.	ditto 10 "
" 10 "	" £470.	ditto 13 "

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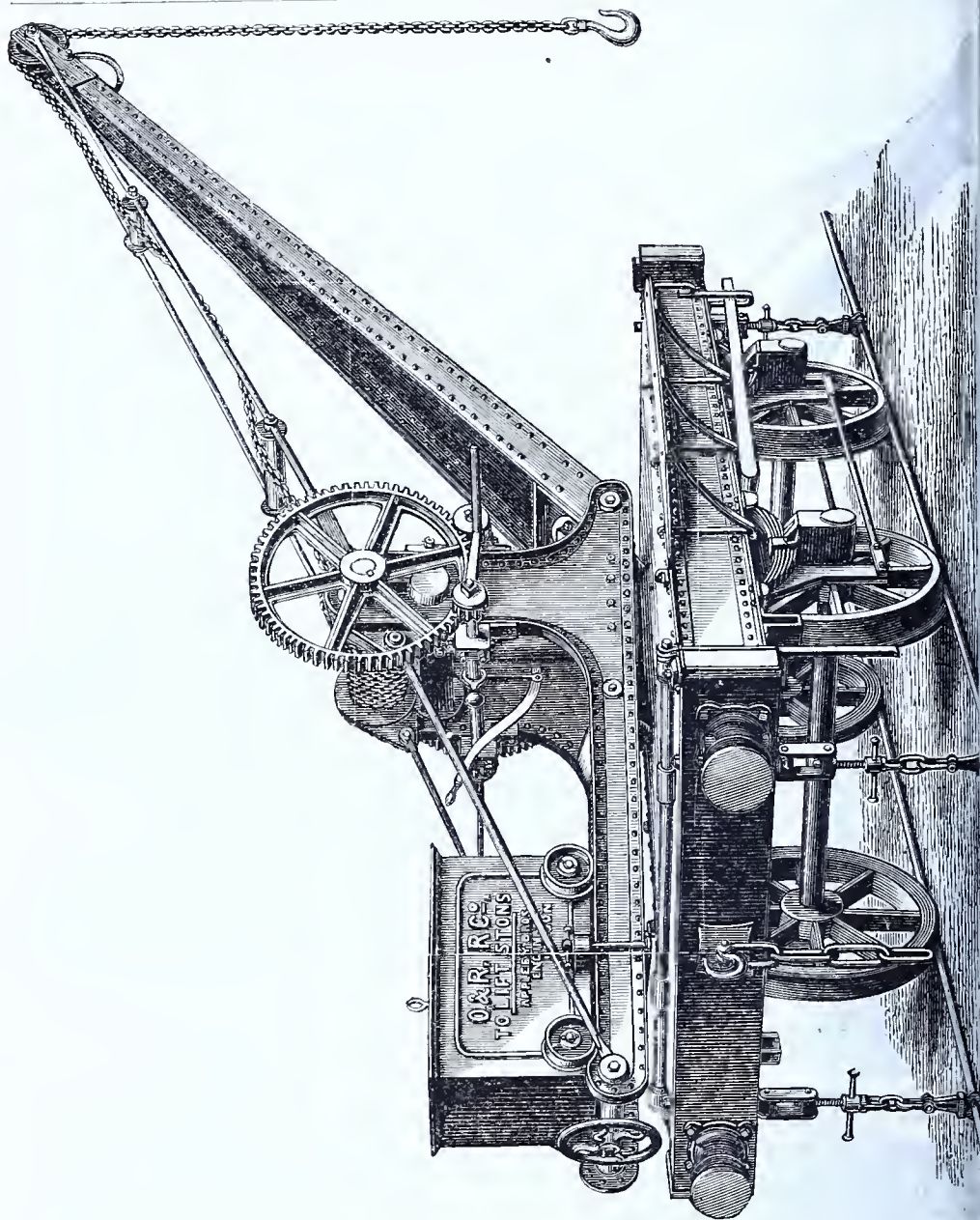


Fig 13. WROUGHT-IRON PERMANENT-WAY CRANE. (No. 7.)

THESE Cranes are made for the Indian Government Railways, are especially adapted for countries where excess of heat or cold renders iron more suitable than timber. They are constructed for running with or rolling-stock on railways and are used as "Accident Cranes," and for general purposes; and the jibs are made lower for passing through railway arches or tunnels. The travelling carriage is of rivetted wrought-iron, a heavy central casting bored to receive the Crane-post; the wheels axles, axle-boxes, guards, springs, drawbar, and coupling-chains, are of the usual permanent-way size, and quality; the carriage is of such size to allow the men to stand at whatever angle the Crane may be. The Crane-post is of hammered scrap iron, all the wheels and pinions are lined up to their pitch-lines, the pinions being thrown in and out of gear by clutches; the motion-shafts run in gun-metal bearings, and the working parts throughout are accurately fitted and carefully finished. The gearing is of ample power, in single and double purchase, with powerful wood-lined wheels. The Crane-sides and tail-pieces are of wrought-iron, and strong cast bosses are rivetted on where the shafts carry the gearing pass through; the balance-box is adjustable by a screw and hand-wheel. There is a friction roller to take the weight off the back-balance and reduce friction when turning. The jib is of rivetted wrought-iron, and the tension-rods carry friction-rollers to guide the chain. Each Crane is provided with a break, on the travelling-wheels, and four clips to fasten to the rails when lifting heavy loads.

The Engraving is from a photograph of a Five-ton Crane. The Ten-ton Cranes have six wheels, but in all respects they are the same, except in the proportions; and are complete and ready for use,

To lift 3 Tons	£260;	weight about 8 Tons.
" 5 Tons	£360;	" 14 "
" 10 Tons	£565;	" 18 "

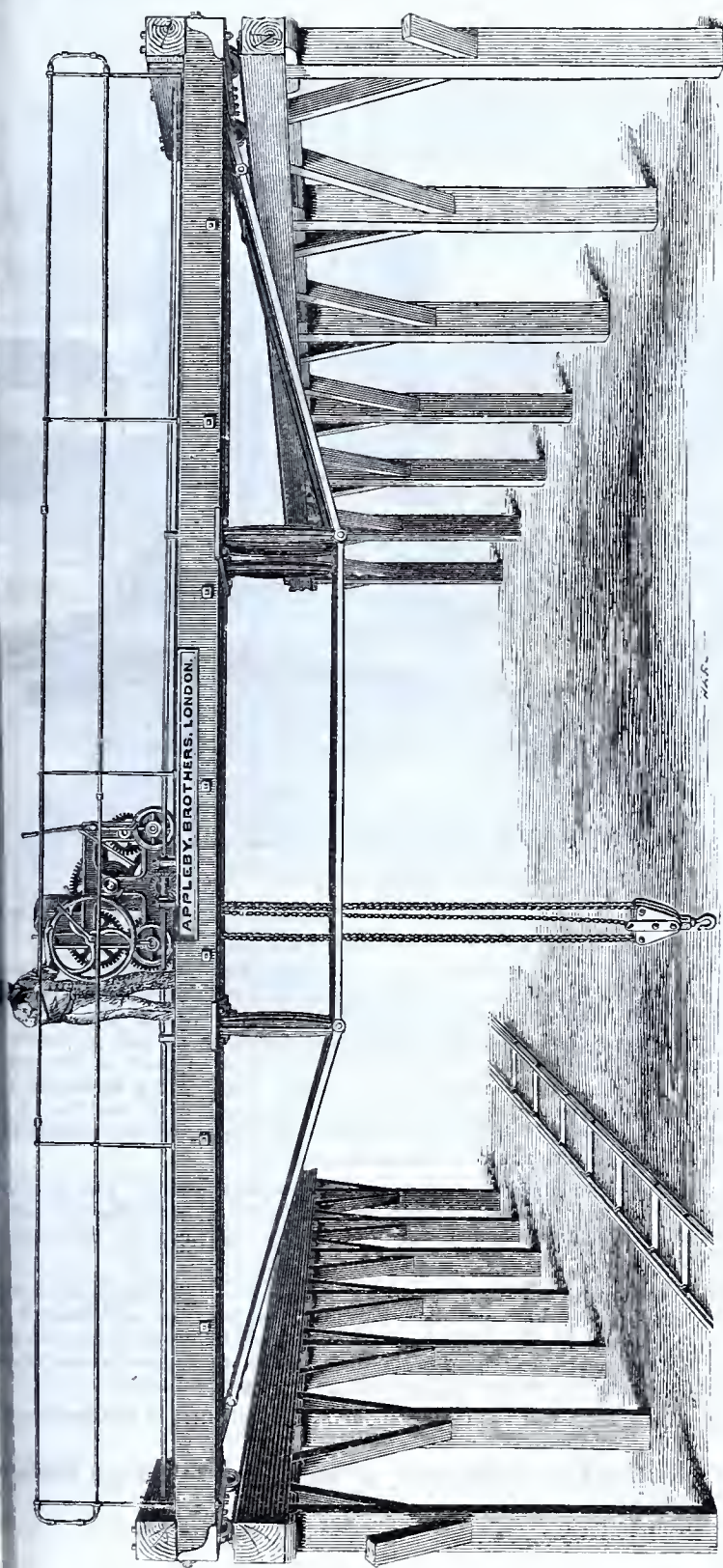


Fig. 14. OVERHEAD TRAVELLING CRANE FOR HAND-POWER. (No. 11.)

WITH TIMBER GARDENS, Wrought-iron Tie-rods, and Cast-iron Distance Pieces; all motions to be worked from the Crab as shown. May be made of any span, and to lift any weight. The Engraving shows a span of 40 feet, and to lift 1½-Ton loads. The Platform or Man-stand extends the full length of span, and consists of open trellis-grating. This description of Crane is made in great variety—with iron Girders if preferred instead of timber—for steam power with Engine and boiler either to travel, or to be stationary at one end,—for power transmitted through a lay shaft, or through an endless rope, &c. &c. Information will be given by the attendant on the Steam Cranes, Mr. JOHN T'HOEN, at the offices of the Royal British Commission.

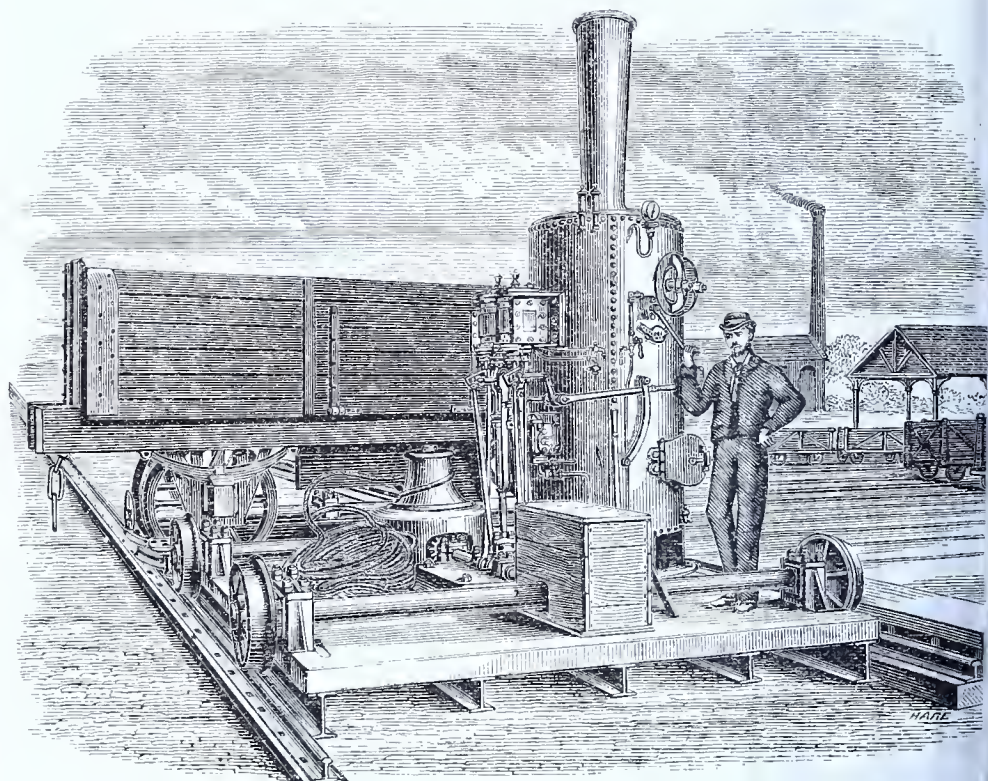


Fig. 15. STEAM TRAVERSER FOR COAL TRUCKS OR CARRIAGES.

This arrangement consists of a movable platform, which travels in a transverse direction upon the different lines of rails upon which the Trucks or Carriages are desired to be placed.

A pair of Engines and vertical Boiler are fixed on the traversing platform, and connected by means of gearing to the wheels on which it travels longitudinally, and also to a capstan-wheel which is used for warping the trucks off the main line, siding, or any other line of rails, and on and off the platform. The two motions are quite independent of each other, and by means of handles under the control of the attendant, can be thrown in and out of gear; so that when a truck has been taken on to the platform by means of the capstan, the warping arrangement is thrown out and the traversing gear put in, which brings the truck opposite to the line of rails on which it is desired to be placed; it is then, by means of the warping arrangement and a dummy capstan, hauled off the Traverser into the required position.

The whole arrangement is self-contained, and occupies very little space. The travelling platform forms both the ash-pit and feed-water tank, the feed-water surrounding the ash-pit, so that no danger from fire need be apprehended. A break is also provided for checking the Traverser at any required spot.

The average travelling speed of the table with truck on it, and also of the truck when being warped on and off, is 50 yards per minute; and the usual duty done per hour is 225 tons of coal, not including weight of trucks, moved from siding to siding; each siding not exceeding 50 yards in length. The duty performed varies according to the distance the trucks have to travel; the average cost of working, including labour and coal, is under 1s. per 100 tons.

These Traversers are in constant use at the Coal Depôts on the Railways in London, and may be seen on application at the above address.

Price £400. Galvanized Iron House, £30 extra; Covering Boiler, £15 extra; Leading and Dummy Capstans, £3 each extra.

Approximate weight about 10 tons.

(No. 15.)

SINGLE PURCHASE STEAM PILE- DRIVING CRAB.

WITH TWO 5½ INCH CYLINDERS, TO LIFT
ONE TON

Price of the CRAB or WINCH, with block-break for pile driving, and also with strap-break for general hoisting purposes	£	s.	d.
	105	0	0

Price of the CRAB, with BOILER Feed-pump, and all connections, as shown	2	0	0
---	---	---	---

One-Ton Monkey, Patent Nippers, Top Sheave and bearings, and 80 feet of Best Tested Chain	26	0	0
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Two pairs of Travelling Wheels and Axles, with bearings	10	0	0
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Price of the Pile-driving Machine, with Woodwork for driving piles 30 feet high, with Engine, Boiler, Monkey, Chains, Nippers, &c, complete and ready for work	270	0	0
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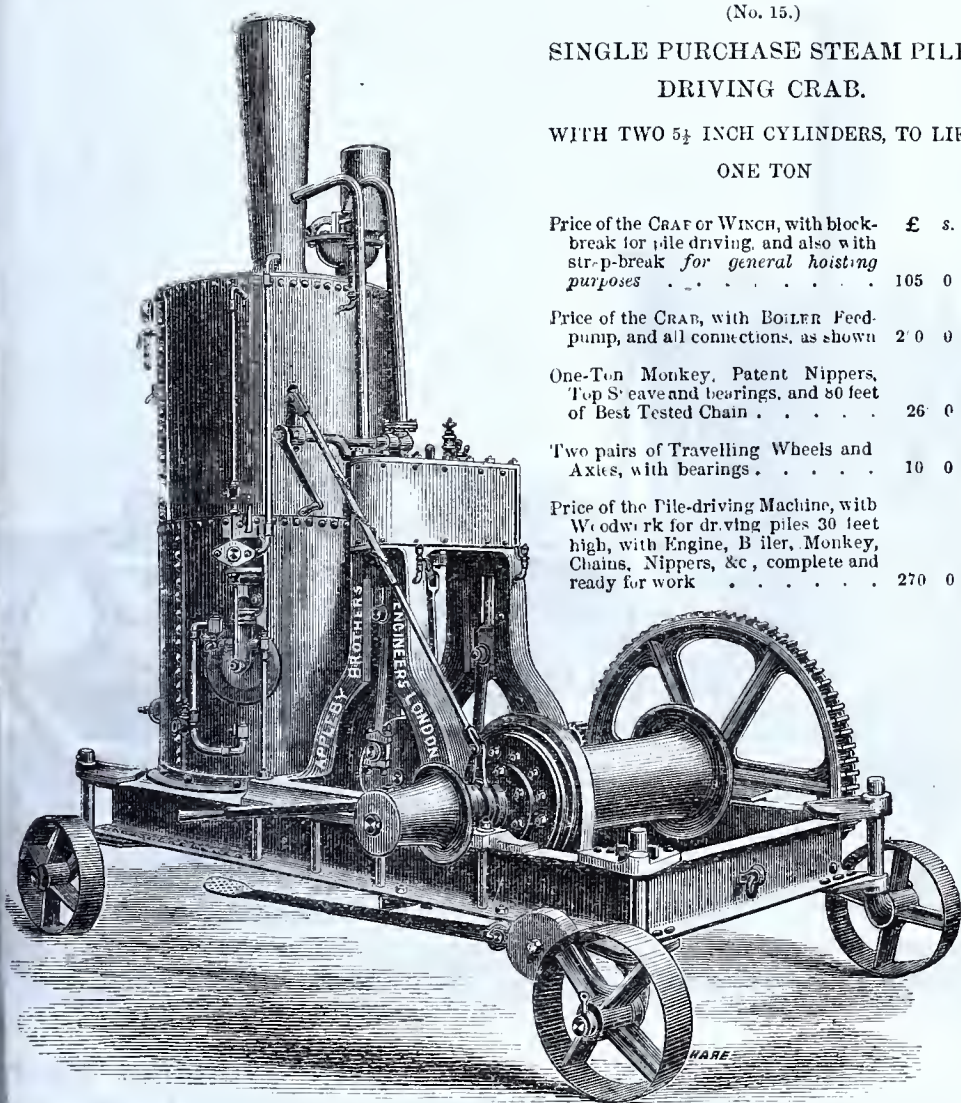


Fig. 16. APPLEBY'S IMPROVED STEAM PILE-DRIVER. (No. 15B.)

THE improvements in this arrangement of machinery admit of a larger number of blows being made per minute than can be obtained by any other system employing the single rope chain; and the whole of the parts have been designed with a view of obtaining the greatest solidity and strength, so as to reduce wear and tear to a minimum.

The lifting gear is single purchase, and is usually proportioned for working with a monkey exceeding one ton in weight. The barrel is loose on the shaft, and is made fast to it by a powerful conical friction clutch, which is thrown in and out of contact with the barrel by the rod-lever shown in the Engraving: this lever is also connected by a rod to the throttle-valve, which automatically regulates the supply of steam.

The capstan-end is used for pitching piles or for hauling; the strap-brake is worked by the foot-er, and is used for holding the load, or for preventing the chain from overhauling too much. The boiler is of ample power, and is fitted with all steam and furnace mountings, and a pump.

The Engine has been specially designed for driving piles with a Machine of the ordinary type. Price £275. Weight about 5½ tons.

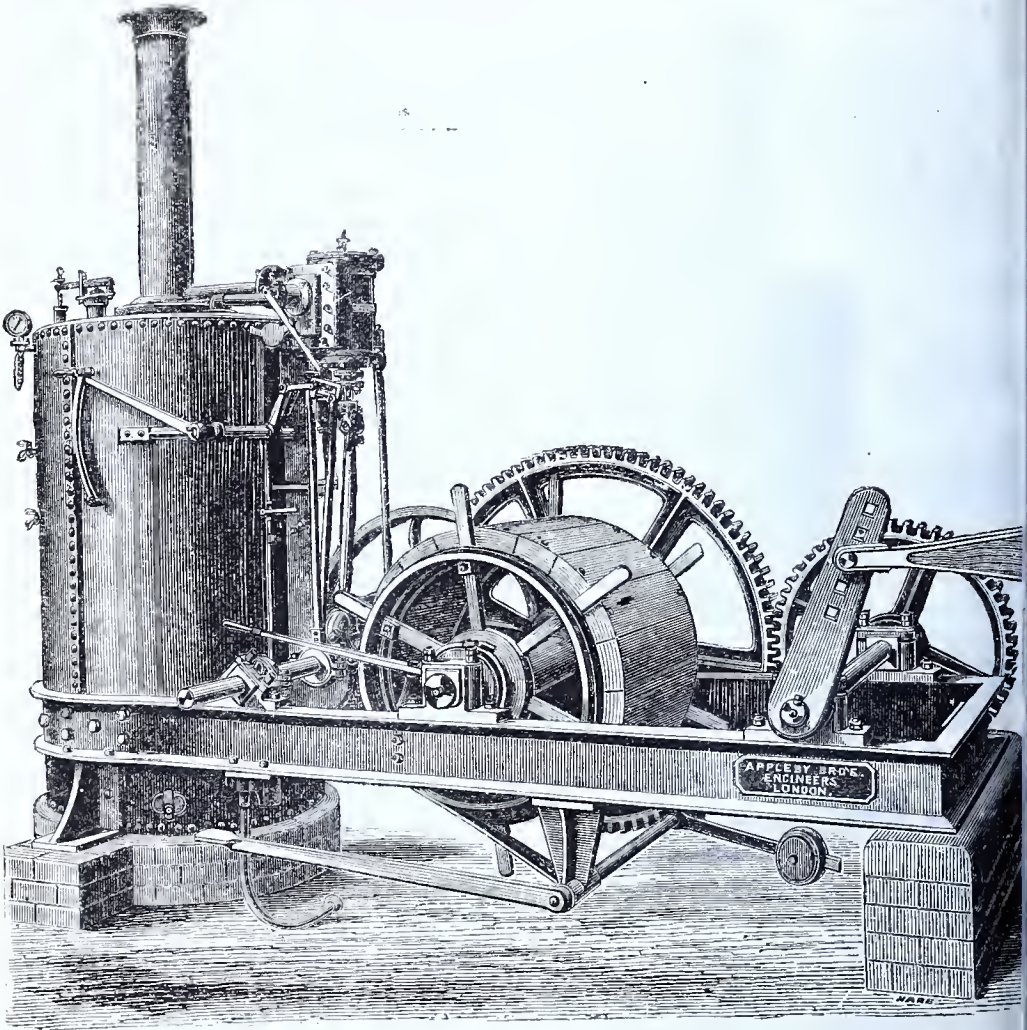


Fig. 17. SINGLE CYLINDER WINDING AND PUMPING ENGINE FOR SMALL WORKINGS, PIT-SINKING, INCLINES, &c. (No. 16.)

THE Boiler with all fittings, the Engine with reversing Motion, and the Gearing with fly wheel and break, are mounted on a strong iron frame, and the whole can be readily removed: the Drum is made with wrought-iron arms and wood lagging for any kind of rope, and has been speeded up, according to circumstances, at from 50 to 300 feet per minute, and the pumping gear from 8 to 40 strokes per minute; provision is made for throwing out of gear either the winding drum or the pumping-arm, as occasion may require.

Although originally made for small workings widely separated, where manual labour was expensive, and where a large outlay in machinery was undesirable, these Engines have been found to give such satisfactory working results that they have been made of almost every size and combination from 3 to 20-horse power (nominal), either Vertical or Horizontal.

COMPLETE WITH FEED PUMP.

	Diam. of Cylinder.	Price.	If without Pumping-Arm and Gear.	Extra if Lock-Plate, Road-Wheels and Shafts.
3-horse power, as per Engraving .	5½ in.	£170	£165	£10
4-horse " ditto .	6½ in.	£205	£198	£12
6-horse " ditto .	7½ in.	£230	£220	£15
8-horse " ditto .	9 in.	£235	£270	£20
10-horse " ditto .	10 in.	£325	£305	£25
12-horse " ditto .	11 in.	£370	£345	£30

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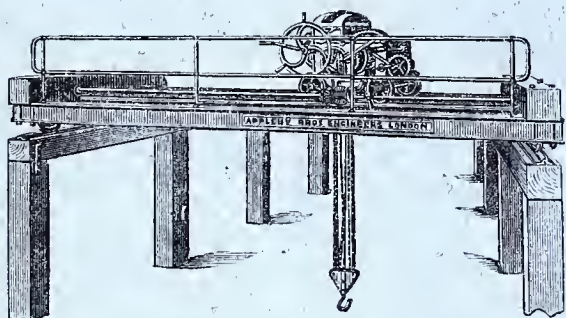
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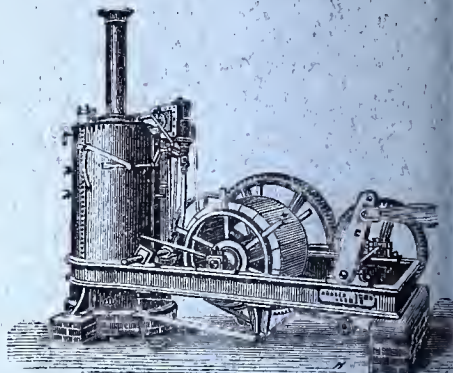
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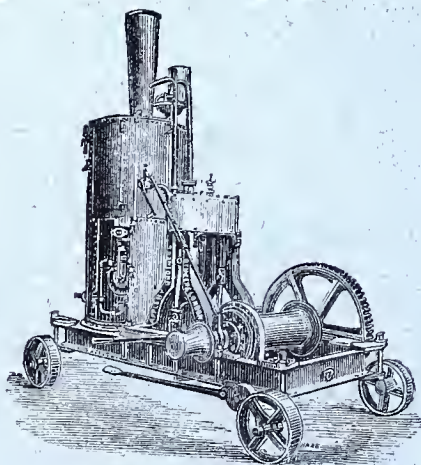
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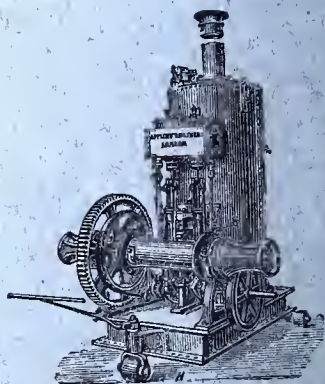
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